



US005166815A

United States Patent [19]

Elderfield

[11] Patent Number: **5,166,815**[45] Date of Patent: **Nov. 24, 1992**

[54] **LIQUID CRYSTAL DISPLAY AND REFLECTIVE DIFFUSER THEREFOR INCLUDING A REFLECTION CAVITY SECTION AND AN ILLUMINATION CAVITY SECTION**

5,029,045 7/1991 Sanai et al. 359/49

Primary Examiner—William L. Sikes
Assistant Examiner—Anita Pellman Gross
Attorney, Agent, or Firm—Cesari and McKenna

[75] Inventor: **David V. Elderfield**, Calgary, Canada[73] Assignee: **NovAtel Communications, Ltd.**,
Calgary, Canada[21] Appl. No.: **662,257**[22] Filed: **Feb. 28, 1991**[51] Int. Cl.⁵ **G02F 1/1335; G02F 1/1333**[52] U.S. Cl. **359/49; 359/48;**
359/83[58] Field of Search 359/48, 49, 83; 362/31,
362/297, 347[56] **References Cited****U.S. PATENT DOCUMENTS**

3,653,138	4/1972	Cooper	359/49
4,868,563	9/1989	Stair et al.	340/825.44
4,909,604	3/1990	Kobayashi et al.	359/49
5,008,658	4/1991	Russay et al.	359/48

[57] **ABSTRACT**

A diffuser for backlighting a display panel consists of a shell having a flat surface for positioning against the backside of the panel. The shell has a cavity with two sections. A reflection cavity section extending into the shell from the flat surface has highly reflective walls one of which opposite the mouth of the cavity defines a ramp. An illumination cavity section extending into the shell intercepts the reflection cavity section at a boundary near the foot of the ramp. When light propagates from the illumination cavity section into the reflection cavity section, the walls of the latter cavity section distribute that light by reflection and the ramp redirects that light to the mouth of the reflection cavity section from which the light propagates to the display panel as a uniform diffuse emanation.

17 Claims, 2 Drawing Sheets